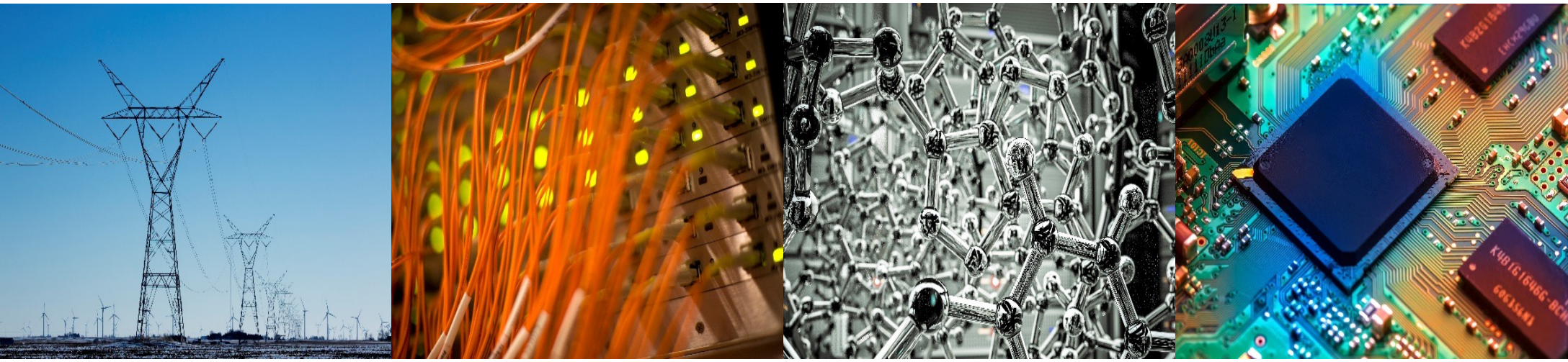
ECE 220 Computer Systems & Programming

Lecture 24 – C++ Examples

April 23, 2026



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Tree Concept Check

What is a root?

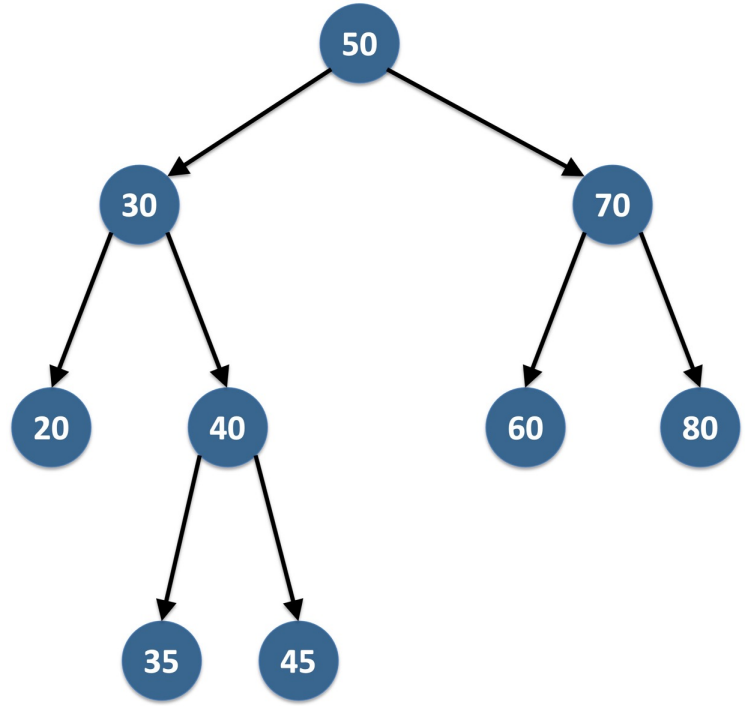
What is the difference between a binary tree and a binary search tree?

What is the height of the BST shown here?

Which nodes are internal nodes in this BST?

Which nodes are leaf nodes in this BST?

Where should a new node with
data ’36’ be inserted into this BST?



C++ Tree Example

go.illinois.edu/ECE220tree2

```
#include <iostream>
#include "bst.hpp"
using namespace std;

int main(){
        cout<<"build a binary search tree"<<endl;
        bst<int> tree1;
        tree1.insert(30);
        tree1.insert(20);
        tree1.insert(10);
        tree1.insert(15);
        tree1.insert(40);
        cout<<"total number of nodes in this tree:”
                <<tree1.countnodes()<<endl;
        tree1.inorder();
        return 0;
}
```

bst.hpp

```
#include <vector>
using namespace std;
template <class T>
class bst{
        public:
                bst();
                ~bst();
                void insert(T data);
                node<T> *search(T data);
                void inorder();
                int countnodes();
        private:
                void delete_tree(node<T> *root);
                void insert(T data, node<T> *root);
                node<T> *search(T data, node<T> *root);
                void inorder(node<T> *root, vector<T> &v);
                int countnodes(node<T> *root);
                node<T> *root;
};
```

```
template <class T>
struct node{
        T data;
        node<T> *left;
        node<T> *right;
};
```